OPERATING INSTRUCTIONS

04.19 PERCUSSION DRILLING SETS

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On these operating instructions

☞ **When the symbol shown on the left is placed before a piece of text, this means that an important instruction follows.**

When the symbol shown on the left is placed before a piece of text, this means that an important warning follows pointing out a risk of injury to the user or damage to the device.

Text **Text in italics means that the actual text is shown on the instrument or display screen.**

Introduction

These instructions cover the following subjects:
1. Checking beforehand
2. Working method
3. Performing repairs

The percussion gouge allows you to take soil samples in difficult conditions, especially where hand drilling is not or hardly possible. However, it remains a hand-drilling device with limitations. Drilling in homogeneous soils is usually done with little problem. Applying a good working method to deviant soils, which may contain rubble or stones, can avoid many problems!

We try to address a number of important points in this manual that can help to optimise the use of the percussion drilling set and/or reduce damage to the device.

1. Checking beforehand

When using the Cobra TT hammer (art. no. 04.19.01):

- ❒ Check that the petrol is fresh. Petrol older than 3 months must be replaced; the fuel must have a fresh petrol smell. Use the right mix ratio (1:50).
- ❒ Check whether the machine starts and consult the instructions for the hammer.

When using the electrical hammer (art. no. 04.18.80 light design or 04.18.81 heavy design) in combination with the generator (art. no: 99.13):

- ❒ Check the oil level of the generator. Use the right quality of petrol in the generator. Ensure that the generator is placed in the synthetic collector box and that the insulation guard is connected (see operating instructions M1.99.13.01).
- ❒ Check the percussion hammer and consult the instructions for the hammer.

- ❒ The insulation guard (art. 99.13.01) continuously measures the soundness of the insulation of the connected device, e.g. an electric steel hammer. If the insulation value is too low, the voltage supply is interrupted by the control. This prevents any risk of contact with parts carrying current, as a result of, for example, moisture, faulty insulation, etc. The generator as well as the appliance is secured by using the insulation guard! The insulation guard controls the generator, but only turns off the appliance!

- ❒ The synthetic collector box (art. 99.13.03) is used to store the generator to prevent fuel and/or oil leakage into the soil.

- ❒ The aluminium step-up (art. 99.16) is used to create a more ergonomic working height.

❒ The fibre glass utility probe is 105 cm long and has a cone with a diameter of 19 mm. The utility probe is strongly insulating and can therefore be used safely to probe the drilling point for cables, conduits and pipes.

Before drilling, check whether there are (electricity) cables, pipes or conduits in the ground (consult Klic). Use the utility probe to safely probe the drilling point. Choose another drilling point if they are present.

❒ The gloves (art. no. 01.11.13) offer protection against small wounds resulting from any burrs on the percussion gouges and protect against contact with any soil contaminants.

Advice (not included as standard in the set):
❒ Vibration-absorbing gloves, especially for electrical percussion hammer;
❒ Footwear with steel caps;
❒ Hearing protective helmet;
❒ Safety glasses, e.g. for hacking away debris using a geologist's hammer.

General

Spontaneous breakage can only be prevented by using the equipment correctly.

Check:
❒ Whether all RD32 connections are sound and clean;
❒ The gouges for defects on the cutting edge;
❒ Whether the casing and rod puller clamp and clamping jaw are clean for optimum use;
❒ Whether the set is complete for the work that you intend to use it for!

2. Working method

These operating instructions describe step-by-step how to take a sample using percussion gouges of various diameters.

Always wear strong gloves, safety glasses, safety shoes, ear protection and a hard hat.

Screw the coupling sleeve to the gouge with the largest diameter.

Screw the striking pen into the coupling sleeve. Note: it is left threaded. (Possibly secure with a wrench).

Place the aluminium step-up next to the sampling point. Insert the gouge vertically into the soil and place the percussion hammer on top. Stand on the step-up for a more ergonomic position.

Lay the electricity cable over your shoulder to prevent strangulation with the machine or gouge.

Start the percussion hammer and keep the machine as upright as possible during hammering. If the percussion gouge "finds its own way", follow this direction with the machine. Do not force it to one side.
If the gouge goes into the ground diagonally, correct the gouge with 1 hand while the other operates the percussion hammer. Keep the percussion hammer and gouge in line.
Keep a good watch on the drop speed. For this, watch a fixed point on the gouge (there is always a spot or a scratch) and check whether the percussion gouge is still dropping.

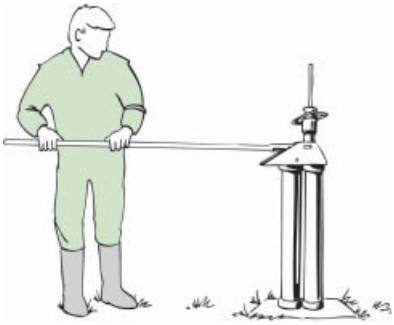
Has the gouge stopped moving? Stop! You are otherwise taking unnecessary risks!

Continuing to hammer greatly increases the risk of a break.

Sometimes imperceptible cracks form that can break during the next drilling!

Remove the gouge and any extension rods from the soil and try to drill with a gouge that has a smaller diameter. You can enlarge the hole later with a gouge that has a larger diameter.

After the first gouge has been inserted into the ground, the striking pen is replaced with an extension rod to assist in pulling it out. Then the rod puller extension (=bottom and top plate and two ABS pipes) is placed over the bar (see drawing). The mechanical rod puller with the casing and rod puller clamp can now be placed on top of this. At this height, the gouge can be pulled out of the ground.
When the rod puller extension is 80 cm high, about 20 cm of the percussion gouge is still in the ground.



Pulling out the first gouge with the rod puller extension

Usually, the gouge can now be removed from the hole by hand. If this is not the case (where there are many unusual obtruding parts in the drill wall, e.g. at rubbish dumps or road surfacing), the gouge can be easily removed using the lifting jack and chain. This is physically easier than pulling it out with brute force.

Place the lifting jack next to the gouge. Wrap the chain around the gouge twice and pull one of the ends through the large eye. Insert the end into the recess of the lever, so that the chain is attached to the lever. Insert the lever with the "knob" into the recess of the lifting jack. With the chain clasping the gouge, make a downward stroke (lever downwards). The chain usually loosens in such a way when lifting the lever that a lower point is grasped for the next stroke.

Get the next percussion gouge (with a smaller diameter than the last one).
Screw the coupling sleeve piece to the percussion drill. Then screw the extension rod into the coupling sleeve.

Place the gouge with the extension rod into the borehole.

Screw a coupling sleeve to the extension rod and then attach the striking pen to the coupling sleeve (if desired, secure with a wrench).

Attach the percussion hammer to the striking pen.

Stand on the step-up. Start the percussion hammer and keep the machine as upright as possible during hammering. If the percussion gouge "finds its own way", follow this direction with the machine. Do not force it to one side.
If the gouge goes into the ground diagonally, correct the gouge with 1 hand while the other operates the percussion hammer. Keep the percussion hammer and gouge in line.

Hammer the percussion gouge into the ground. Remove the percussion hammer. Unscrew the striking pen from the coupling sleeve. If this is stuck, unscrew it using the tools supplied.

The coupling sleeve can also be unscrewed using the open ended spanner with the extension arm and the pipe wrench.

If the coupling sleeve is secured too tightly to the percussion gouge, it can be unscrewed using the pipe wrench and the catcher.

The deeper penetrating gouges can be pulled out from ground level.

Place the mechanical rod puller on the extension rod.

Place the universal casing and rod puller clamp on the mechanical rod puller and then place the clamping jaw in the casing and rod puller clamp.
Check whether the filling ring has been fitted.

Place the handle in the mechanical rod puller.
Pull the gouge with extension rod out of the borehole.

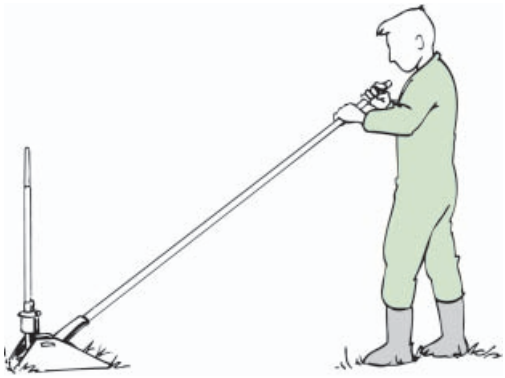
☞ **Avoid knocking sand and stones into the borehole when raising the gouge.**

It may be that you are unable to move the gouge at all. This is usually caused by the fact that it catches on stones/ rubble in the wall. These materials may obstruct the removal of the gouge. A jolt will usually solve this.

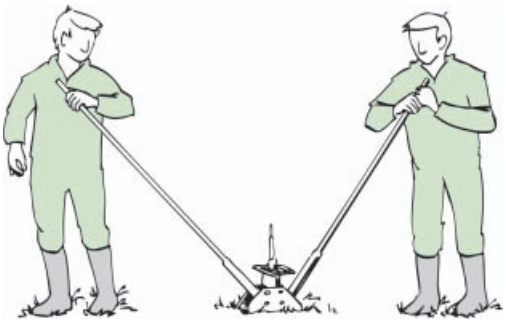
☞ **In extreme cases, this can be solved by placing the machine on the adapter and hammering briefly, while keeping the bars under tension using the extraction system (this is only possible if you are working with 2 people).**

The percussion gouges can be pulled out of the ground using:

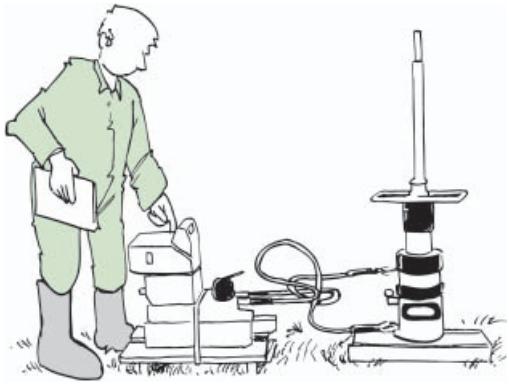
the 1-person-operated mechanical rod puller;



the 2-person-operated mechanical rod puller;



and the hydraulic extraction system.



Use the bent spatula to cut the cylindrical column material off along the compartments. The material that is left is an almost undisturbed profile suitable for studying or sampling.

Any stones or rubble can be removed using the geologist's hammer.

3. Use of the core sampler 04.19.43

3.1 Use of the core sampler with PVC sample tube

Unscrew the cutting shoe from the core sampler and place the PVC sample tube in the core sampler.

Place the core catcher in the core sampler and push the sample tube into the core sampler.

Screw the cutting shoe onto the core sampler.

Then screw a coupling sleeve on the core sampler and screw a striking pen into the coupling sleeve (see page 3). Place the step-up and place the percussion hammer on the core sampler and hammer it vertically into the ground.
When the core sampler is at the right depth, it can be pulled out in the same way as the percussion gouges (see page 5).

Unscrew the cutting shoe (possibly with a wrench) from the core sampler and remove the PVC sample tube.

The sample can be studied immediately in the field or prepared for transport to the laboratory by closing the sample tube with protective caps.

3.2 Use of the core sampler (04.19.43) with the foil insertion kit (04.19.43.01)

All the foil insertion kit parts are used as well as the percussion hammer and the core sampler (04.19.43).
The kit includes an extension pipe for the core sampler, thin-walled PE foil, a foil ring, a guide cylinder for foil, a slide ring and the stand (synthetic, 2 parts).
You may use the step-up as a worktable.

Unscrew the head from the stand and slide the guide cylinder for the foil over the long part of the stand and secure the head again. Then screw the foot into the stand and place it on a firm surface (e.g. the aluminium step-up).

Take the thin-walled PE foil, unroll the first 20 cm and slide this over the stand to the end of the foil guide cylinder. Slide the rest of the foil over the guide cylinder.

Use the slide ring to press the foil compacter onto the metal foil guide cylinder.

Unscrew the foot from the stand and remove the foil guide cylinder with the foil from the stand.

Slide the synthetic foil ring into the top of the metal foil guide cylinder.
Slide a few centimetres of the foil over the foil ring and secure it with a rubber band or O-ring.

Take the extension pipe and slide the foil guide cylinder with foil and foil ring into the extension pipe.

Now screw the cutting shoe to the extension pipe.

It is now ready to attach to the core sampler.

Screw it to the core sampler.

Attach a coupling sleeve and striking pen to the core sampler, place the percussion hammer and hammer the core sampler into the ground. Withdrawing it from the ground is effected as described for the percussion gouges (see page 5).

Unscrew the cutting shoe (if desired, using a wrench) and the extension pipe from the core sampler. Carefully remove the foil with sample from the core sampler.

Remove the foil ring.
The sample can be examined immediately (through the foil) or by cutting the foil away. It can otherwise be packed away for transport for later examination.

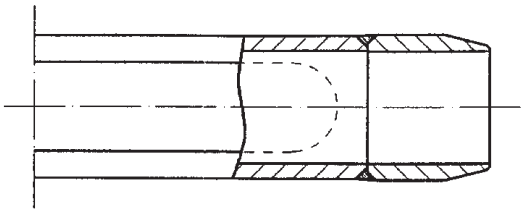
The parts and new foil can now be used for the next sampling.

4. Making repairs

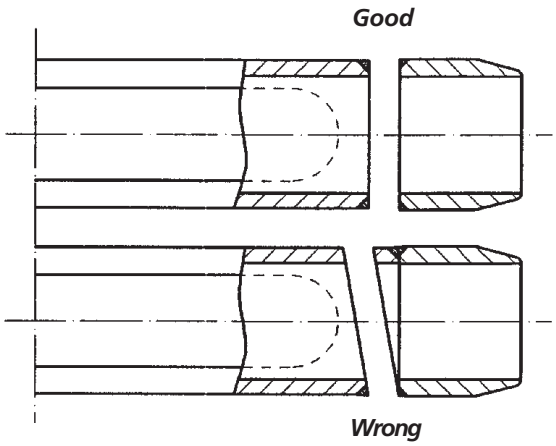
4.1 Replacing the percussion drill cutting shoe

Material required:
- ❒ Welding equipment
- ❒ Welding electrodes
- ❒ Burner or oven
- ❒ Hacksaw
- ❒ Grinding machine
- ❒ Cooling facility

☞ **To weld two different types of steel together, use a basic electrode (or welding wire) that complies with the DIN 8556 technical specification.**

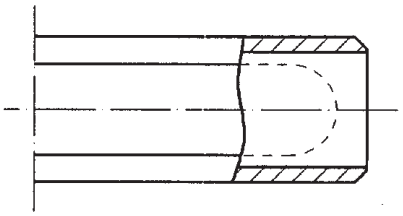


Remove the damaged cutting shoe using a saw or lathe.



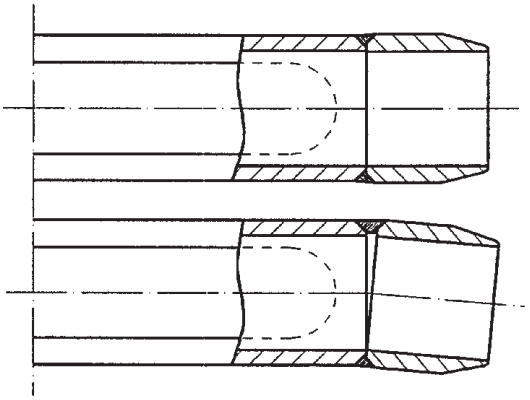
Ensure that this is done as straight as possible (the two parts should preferably turn flush up against each other) to avoid problems when welding on the new cutting shoe.

Using a grindstone, lathe or belt sander, make a slanted edge on the cut-off percussion gouge to promote the burn-in of the electrode.



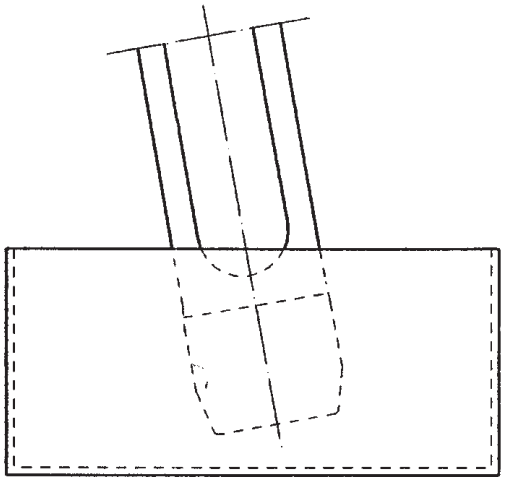
Good

Before welding the cutting shoe must be tack welded (every 120 degrees). Try to do this as straight as possible. One can mark this using a guide (e.g. a ruler or if necessary an electrode). After this the tack welds are grinded out as far as possible. Now weld the whole (without welding faults).
When MIG - MAG welding use Megafill 710 m diameter 1.2 mm as welding wire. As protection gas use Argon mixing gas 80-20. After welding, do not forget to remove the slag from the joint and file down the tack weld.



Wrong

The welding joint should now be heated to approx. 200 °C using a burner or other heating method. Ensure that the welding joint is at the right temperature at the moment of welding.
The cutting edge (first 2 cm) of the percussion drill cutting shoe is hardened inductively. If the preheat temperature is too high, tempering occurs causing the cutting edge to be less hard and thus less wear-resistant.
Now place the percussion gouge on a surface on which one can rotate the gouge. Turn the gouge with one hand while welding with the other hand.



After welding, the welded part must be cooled down slowly by, for example, placing the head of the gouge in a container with insulation material (e.g. vermiculite).

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